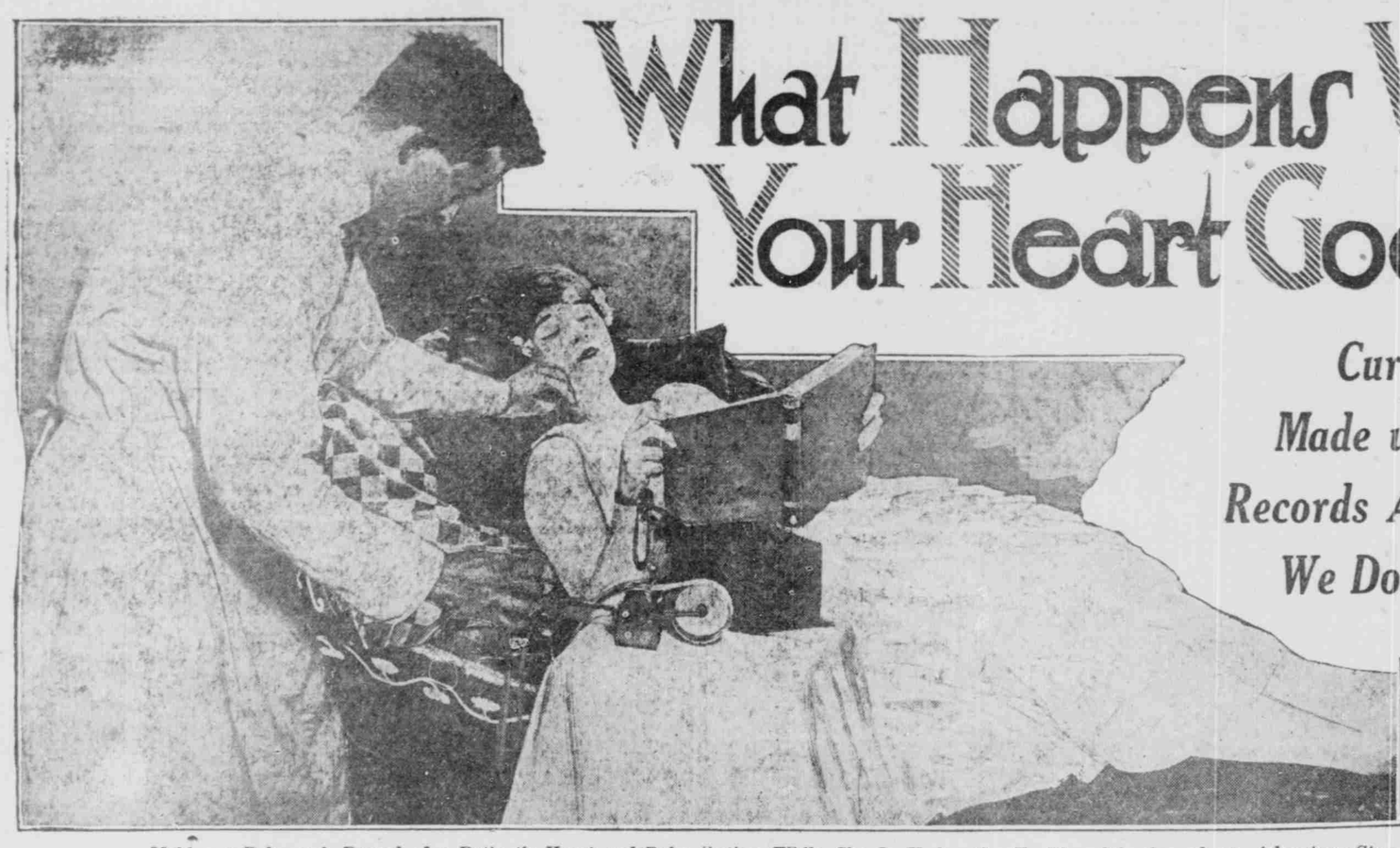
What Happens When Your Heart Goes Pit-a-Pat

Curious Scientific Experiments Made with a Telltale Machine That Records All Our Emotions, Even When We Don't Tell the Truth and When We Fall in Love.



Making a Polygraph Record of a Patient's Heart and Pulse Action While She Is Under the Exciting Stimulus of an Adventure Story.

By William Hamlin

THE electrocardiograph, the infinitely sensitive machine by which the heart specialists record the heart quake even as the seismograph reports the cosmic disturbance, has, after exhaustive experimental effort, been so perfected that the doctor can now actually photograph every emotion of the human heart. Love, anger, falsehood, are reported on the machine with the nicety of a Bertillon system of fingerprinting, and officials in many parts of the country are seriously considering the use of the machine in the courts, both criminal and domestic.

Almost anything can happen now when the heart goes pit-a-pat. It used to be that it merely indicated the pump of the body's dynamo as the blood flowed in and was squeezed out to make its journey through the arteries to refresh the system and build up the worn and wasted tissue. But now, provided the machine is attached to a person, a term in the prison, a blighted romance, the detection of crime—indeed, nothing is beyond possibility that comes within the scope of human thoughts and feelings—when the heart goes pit-a-pat.

To explain to the reader who is not familiar with this new device for aiding treatment of the sick, it might be well at this time to describe the electrocardiograph as briefly as it may be intelligently explained so that, with the remarkable photographs on this page, it may be clear.

The machine is, in truth, a modified galvonometer with a powerful electric field excited by a constant current. Between the poles of the magnet is a very small gap through which a quartz filament is stretched. When the wire is displayed by the passage of an electric current a small diaphragm is moved in such a way as to permit a tiny ray of light to strike a sensitized photographic plate. The motion of this ray of light varies in accordance with the electric current affecting it. When the electrodes are attached to a patient the slight amount of electrical energy contained in the beat of the heart affects this diaphragm so that the result is a moving picture of the heart beat in the shape of the rising and falling lines depicted on this page.

Voltage of a Heart Beat.

The heart beats may generate only .001 or even .002 of a volt of electricity, yet the machine records its every movement just as the high-powered camera reproduces every movement of a man lifting his leg when walking, something most persons have seen in the motion pictures.

Normal hearts produce practically the same picture. But the beat of the diseased heart, as shown on this page, varies in accordance with the nature of the trouble of the organ. Thus heart block, caused by the refusal of the valves to work, displays two little rises in the photograph, as shown on this page, while "murmuring" hearts takes on the pictured characteristics of musical notes. Each trouble of the heart shows a different picture to the doctor and, as each trouble produces practically the same picture in each patient, the art of diagnosis is rendered simple through this complex machine with supernatural powers. The doctors say that the machine, when properly adjusted, cannot err. If there is anything at all the matter with the heart the delicate instrument will jot it down as faithfully as a phonograph records the tones of the human voice. Because of this persons whose illnesses have been wrongly attributed to trouble of the heart, quickly are apprised of the fact and lose no time and suffer no injury to this important organ by taking treatment or medicine that could not aid them.

Measuring Love Emotions

It is the infallibility of this machine which has caused the widespread discussion of its possibilities. The womenfolk are particularly interested, and, by the by, particularly those who have that trouble of the heart caused by love. With the aid of the electrocardiograph the love emotion could be certainly detected. The young woman, doubtful of her lover's sincerity, might take him to the heart specialist, have him attached to the machine and watch with her own eyes how badly the light jiggled on the sensitized plate when she took hold of his hand. In truth some such cases would make a "caret" on the beat of the heart which, if reproduced here, would have an apex tall enough to reach the top of the page. And if he didn't love her the machine would show normal and disclose no sign of heart excitation—unless, forsooth, it was one of these platonic love fellows that few women want.

Prosecuting attorneys and police officials are vitally interested in the help that the cardiograph might give them in putting suspects through the "third degree." The nervousness of a person telling a falsehood would be plainly shown in the excited and uneven beat of the heart, while the beat of the heart of the innocent would be as smooth and regular as a dash plus a caret plus a dash. In testing the veracity of less hardened criminals the polygraph, the machine pictured on this page, which reports the pulse and heart beat by attachment to the wrist of a supine person, would be efficacious enough. The electrocardiograph, with its impressive electrode attachments and its manner of operation, would probably be more effective when indicating the workings of the mind of a calloused nature.

Incidentally the machine proves something that has long been a mooted question. What use can science make of it is a question now arising. The cardiograph shows that a thought actually generates electricity. Just cause excitation in the mind of a patient and the heart beats faster because it is imparting more electricity to the heart. Or does the mind merely call out the reserve electricity in the heart? Perhaps, some day, with thousands of persons thinking on a certain subject, with some such instrument to filch the electrical energy, the prophecy of the Scripture that faith can move mountains will become a fact.

As is ever the case when a great invention has been made, from the very necessity of circumstances the well-to-do were the first to derive benefit from the electrocardiograph. But now, in New York City, owing to the effort of Dr. Louis Faugeres Bishop, the eminent heart specialist, the wonderful invention has been made available to the poor. One has been set up in the Good Samaritan Dispensary at Broome and Essex streets, in the heart of one of the great city's most populous sections. And the poor are flocking there to receive treatment.

This dispensary was founded in 1832. Last year it treated close to 75,000 persons. It is self-supporting. It asks 10 cents, a quarter, a half-dollar, perhaps a dollar—what the patient can afford. But the late founders—Samuel Riker, E. Winchester Donald, Benjamin H. Field, William H. Halstead—men whose names are synonymous with the history of the development of New York City—probably never dreamed that for the nominal sums charged the poor should ever receive such expert and modern treatment. In mediaeval days such things would have been preserved for royalty.

The machine sometimes is more than useless—it is a menace—in the hands of a doctor not only a heart specialist but a master electrician.

One of the Curious X-Ray Photographs Which Enabled Dr. Bishop to "Map Out" the Vibratory Action of the Human Heart Under Varying Emotions.

Because of this, to preclude any mistake in the mechanical operation of the device, Dr. Bishop entrusts the actual operation to his brother, who is a graduate electrical engineer with 25 years' experience in handling electrical machines. The complicated, delicate instrument to him is as simple as a child's toy, and as easily handled. In his laboratory he told the writer an interesting incident of the mishandling of the machine when out of order.

"My brother some weeks ago," said he, "was called in consultation with a physician whose electrocardiograph reported the most amazing heart action yet seen. It closely resembled the teeth of a saw filed out of a piece of steel as undulated as the waves of the ocean. They talked it over and could make nothing out of it. Then it was brought to me. I told them that there was an interference with the machine some place and set about to repair it, which I did. Then they asked me what had caused the marks recorded. I explained to them that what had been recorded was the infinitesimal vibrations of the city of New York which the machine reported as the seismograph an earthquake. To prove my theory I interfered with the operation of the machine and got the result. The quake of the city, however, was not enough to cause alarm.

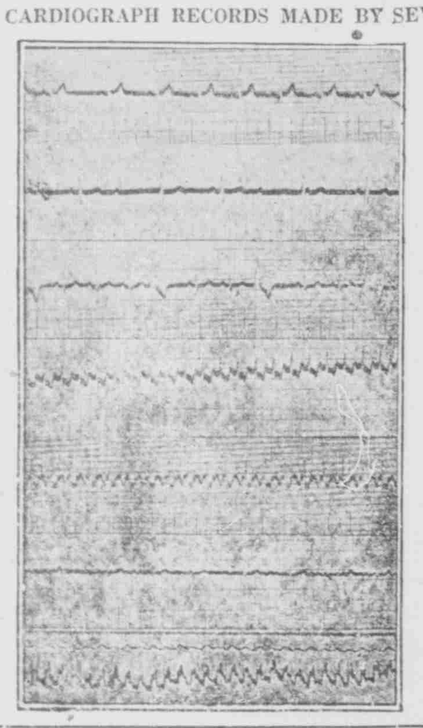
Speaking of one of the cases he has treated, Dr. Bishop said:

"Mr. L. B. S. O. came under my care two years ago during an attack of completely broken compensation. His record also showed that auricular fibrillation had taken the place of the normal auricular contractions. He responded promptly to treatment and under careful supervision has been able to carry on his work during the past two years, which included various war activities, and is at the present moment in active business. All this in spite of the constant presence of auricular fibrillation, as shown by repeated records."

Studying the Record of a Patient's Pulse Action While Taking an X-Ray Photograph of Her Heart.

Cardiograms Showing How the Heart Skips and Jumps Under Three Different Emotions—(1) Over-exertion, (2) Nicotine Poisoning, (3) Anger.

CARDIOGRAPH RECORDS MADE BY SEVEN DIFFERENT HUMAN HEARTS



1—The Regularity of the Line's Rise and Fall Registers a Normal Heart Action.

2—Sluggish Action of a "Blocked" Overworked Heart.

3—A "Fluttering" Heart Beat.

4—How a "Murmuring" Heart Is Recorded by the Cardiogram.

5—Cardiograph Chart of a Heart Laboring Under Intense Excitement.

6—A Feeble Beat Which Denotes Faulty Heart Action.

7—An Alternating Pulse Due to the Failure of the Heart Valves to Work in Unison.